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ABSTRACT

This paper aims to provide a reflective overview of the curriculum developments in teacher education for Scotland in the Division of Technology, Department of Maths, Science and Technology Education, University of Strathclyde. A course in technology must by its very nature be frequently updated and reviewed if it is to be considered to be pertinent and relevant. This paper aims to gauge the design and technological confidence and developing capability of students. Two cohorts have completed the first two years of the four-year degree course, B.Ed Design and Technology. As the third cohort begins, progress to date is considered. The question is asked: Does the course educate for technological literacy and provide students with the creativity to educate for technological literacy with perspective, sensitivity, creativity, and confidence? This evaluation forms the basis of the paper. Identification of the strengths and weaknesses existing in the current system will provide indications for subsequent developments of the B.Ed Design and Technology at the University of Strathclyde. Appendices include changing face of technology subjects; chronological changes in examination subjects presented by technical departments; comparison of girls and boys in technology studies, graphical communication and craft and design; and interim questionnaire analysis and school and student questionnaires. (Author)

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Faculty of Education University of Strathclyde

Curriculum Developments:
Teacher Education for Technological Literacy :

A Scottish Perspective

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Abstract for paper presentation at JISTEC 1996

Jerusalem International Science and Technology Education Conference on

Technology Education for a Changing Future : Theory, Policy and Practice

Curriculum Developments-

S4: The Teacher; Teacher education for technological literacy:

A Scottish Perspective

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Our paper aims to provide a reflective overview of the curriculum developments in teacher education for Scotland in the Division of Technology, Department of Maths, Science and Technological Education, University of Strathclyde.

A course in 'technology' must by its very nature be frequently updated and reviewed if it is to be considered to be pertinent and relevant. This paper aims to gauge the design and technological confidence and developing capability of our students. Two cohorts have completed the first two years of the four year degree course, B.Ed Design and Technology. As the third cohort begins, we consider progress to date and ask the question : Does the course educate for technological literacy and provide our students with the creativity to educate for technological literacy with perspective, sensitivity, creativity and confidence ? *(Scottish Consultative Council on the Curriculum, 1994, p.5,6)*

The evaluation forms the basis of our paper. Identification of the strengths and weaknesses existing in the current system will provide indications for subsequent developments of the B.Ed Design and Technology at the University of Strathclyde.

Curriculum Developments

Teacher education for technological literacy :

A Scottish Perspective

Introduction

A brief historical perspective illustrates the influences and factors which necessitated the need for change in teacher education for Technology in Scotland. This brief retrospective describes the review of curriculum and national educational developments which led to the Diploma in Technical Education being superseded by the initial development of a Bachelor of Technological Education degree, which in turn provided further impetus for the subsequent validation of the current Bachelor of Education in Design and Technology degree, in accordance with the 'Guidelines for Initial Teacher Training' issued by the Scottish Office Education Department (Jan.1993)

Identifying the Need for Change : School Curriculum Changes

From very early days in education, Technical subjects have been perceived as vocational. In 1903, Circular 375, issued by the Scottish Education Department proposed a technical certificate for those who set their sights on technical and industrial occupations. The Brunton Committee Report, 1963, recommended that links between schools and colleges could be strengthened by school courses being more vocationally orientated. Consequently, the academic standing of the pupil educated in Technical Department has been perceived as lower. Indeed, 'if they can't manage this (academic subject) then send them to Technical' was a common utterance.

This, unfortunately, has resulted in Technical Departments being tarnished with a history which is proving hard and slow to change.

Since the 1960's the subjects presented by the Technical Departments in Scotland have been undergoing change (Appendix A). In 1962 there were five Ordinary Grade and four Higher Grade subjects. This has since been reduced to three subjects at each level. Namely, Craft and Design, Graphical Communication and Technological Studies. Each change has resulted in an amalgamation and broadening of the curricula content. There is now almost no correlation between the subjects offered and specific vocations which were so explicitly targeted in previous years.

With the change from 'O' grade courses, which were summative, examination based to the largely continuous assessment focused Standard Grade Certificate in 1980 came a change in teaching approaches. The teacher, now a 'resource', was required to adopt the role of facilitator or advisor. Courses were to be less a series of skill practice sessions and more centred on problem solving activities.

The most recent Scottish Office Education Department initiatives to have effect on the teaching of technology in Scotland are the National Guidelines for 5-14 Environmental Studies, 1993 and Higher Still: Opportunity for All, 1995. With 5-14, the umbrella title of Environmental Studies brings together science, technology, information technology, health education, and social subjects. The Higher Still programme, within Technology Departments, will have the collective title of Design, Engineering and Technology. This proposes changes to the upper secondary school with the merging of Craft and Design with Graphic Communication into Design Communication, offering an Advanced Higher level design based subject with which pupils can access university. Technological Studies remains, in a revised and extended form.

These initiatives serve to create a cohesive, progressive continuum for technology education as underpinned by the rationale developed by Scottish Consultative Council on the Curriculum (SCCC) entitled 'A Framework for Technology Education in Scottish Schools,: A paper for Consultation and Discussion and 1994'. The framework discussed in the SCCC paper attempts to identify characteristics of appropriate and effective technology education, and encapsulate its overall aims, nature and value.

Influences for Change : Teacher Education

Four Scottish Colleges of Education provided Technical Teacher training through which students were awarded a Diploma in Technical Education (pre 1987). The courses comprised independent components of woodcraft, metalcraft, applied mechanics, technical building drawing, electrical theory, art, health education and education. Their students were presented with Nationally moderated theory exams and practical workshop skill speed tests.

There were a variety of routes which allowed access to the Diploma course - school leavers with appropriate school certificates, qualified apprentices of engineering or related trades and holders of Higher national Certificates. This enabled students to complete the diploma course in 4, 3 or 2 years as appropriate to their accredited prior learning. Each year there would be up to 100 students receiving the diploma from Jordanhill College of Education, Glasgow, alone. These teachers, prepared to teach all subjects within the curriculum of a technical department, also offered specialist knowledge in two of the five subjects presented to certificate level. The majority of the pupils were boys aiming to secure an apprenticeship in building trades, drawing offices and fabrication yards, etc.

In 1985, the Scottish Office Education Department, (SOED) required that the diploma courses should be replaced by a degree. The name chosen for this new qualification was Bachelor of Technological Education, B.Tech Ed.(1987). In response to the revisions the school curriculum was undergoing at this time, there was to be shift from the teaching of specific vocational aspects of the courses to problem solving. Many of the teachers in the field were attempting to cover content of a curriculum with which they were unfamiliar. The B.Tech.Ed., at Jordanhill College in partnership with Glasgow University, Faculty of Engineering, attempted to address these issues by structuring a course to prepare newly qualified teachers appropriately. This course included 'Technology Design Workshops', (Doughty et al, 1991) comprising problem solving activities which incorporated computer control, mechanisms, electronics and product analysis, utilising proprietary construction and system kits. There were also Engineering craft workshops which provided manufacturing skills in a range of materials and processes which were of use both in school and also for the individual project the students undertook in the final year.

When Jordanhill College of Education merged with Strathclyde University, in 1993, there was a timely opportunity to create a new degree. National developments and deliberations, together with feedback from schools and students made it clear that certain changes were necessary in order to meet the needs of teachers who would be preparing our young people for the next millennium. This resulted in the development of B.Ed. Design and Technology.

The Teacher Education Institutes have a responsibility to prepare, innovate, inspire, react and be proactive with the educational field. Therefore the University of Strathclyde aims to develop initiatives to support, develop, extend teachers in post

with content, methodology, knowledge and skill for the new curricula. To this end, a part-time, inservice degree B.Ed Design & Technology (INSET) was developed in parallel to the B.Tech. Ed. and continues today. This enabled the holders for the Dip. Tech Ed, to achieve degree status. There is also a range of short inservice courses available.

Period of Transition : Developing Confidence

A course developing in the last decade of a century has to be visionary. In order for the vision to be realised it needs to inspire many others who are in a position to influence change at school level. Too radical a shift could, potentially, alienate a large number of schools, parents and teachers. This is the dichotomy our students find themselves in. They study to teach the curriculum as it is and will be and yet have teaching experience in schools that are teaching to a scheme prepared in line with different guidelines and by teachers who trained for a different kind of technical curriculum and philosophy.

At the University of Strathclyde strategies are being sought which promote student independence and enable the students to have the confidence to deal with the expectations of the school. These include evaluation and reflection models, programme planning, negotiation skills and video appraisal. Students, operating in what Elmer and Perry of Getting Results and Solving Problems Project (GRASP) at King Alfred's College, Winchester, describe as 'culture of unavoidable dependency', need to have a supporting 'framework which helps them carry forward a set of personal intentions' (Elmer and Perry 1992). Schools view the B.Ed. Design and Technology course, at Strathclyde, in comparison with the previous B.Tech. Ed. Degree, as giving the

students 'a better grasp of whole school and educational issues'. There is, we hope, a supporting framework in place.

Aims of the Change : Course Rationale

We recognise that teachers do not operate as technicians carrying out routines, but as self evaluating, self monitoring, extended professionals who can operate in a variety of complex and changing situations. Therefore, the Bachelor of Education in Design and Technology course aims to develop skills and attitudes which will accommodate changes in education and in society in the broadest sense, through confidence, independence of thought, initiative and vision.

Appropriate teacher education is one way in which future generations can develop informed attitudes and sensitive values within their technological perspective, considering the value issues that need to be addressed. The opportunity to raise awareness of the socio-economic, environmental and ethical implications of the work of professional designers and technologists will enable our students to examine the illusion of value-free technical rationality ; exploding the generally perceived notion that there is only one right answer to every problem.

In adopting this philosophy as the basis for Design and Technology teaching, the course development team (appendix B) were only too well aware of the difficulties of predicting the advances that technology will make within the next few years. The course was seen, therefore, not to be content specific as such content is quickly outdated. The course was designed to encourage students to develop a research based approach to learning and active learning styles which will equip them with interpersonal and communication skills, plus knowledge of good practice.

It was decided that the experience students would gain following a process and resource based approach would equip them more appropriately for teaching design and technology than specific *training* could have done.

Implementation Model.

Based in a purpose built, self contained unit within the Faculty of Education at the University of Strathclyde, the course capitalises on the resources of two nationally renowned centres of education, by utilising the resources and teaching modules from of the Engineering, Business and Science Faculties in addition to the more specific education studies. The Division of Technology, Department of Maths, Science and Technological Education is equipped with workshop facilities similar to school, with manufacturing processes possible in wood, plastic, and metal; CNC lathes and milling machines, computer suites for CAD and CAG, literature, magazines, and internet resource base, design studios and graphics, computer control lab, pneumatic lab, electronic and mechanic labs in addition to class room accommodation.

Design permeates throughout. The engineering and technology classes provide knowledge and understanding which creates a firm foundation of the fundamental concepts of a specific nature which the students can transfer and apply to any design situation or context to enable a detailed analysis, a critical evaluation or to generate design ideas. These inputs on engineering technologies are included in the initial two years of the degree programme.

The students understanding of design is developed through a range of project based, design assignments, supported by design tutors. The selection of the project briefs is the focus of many student evaluations, highlighting the difficulties in devising course

work that will interest and motivate a broad spectrum of individuals. With motivation being the key to education, this is of central concern to our evaluation.

The design assignments involve many practical modelling techniques for a wide variety of media, kits and materials, with processes and equipment which enable design ideas to be explored and communicated with increasing confidence.

In addition, each student will complete two Industrial Placement totalling 6 weeks over 3rd and 4th year.

These placements will enhance the students understanding of the made world and encourage them to make connections between design and technology in school with the world of work. They range from manufacturing to service industries. A wide range of technologies and applications of a design philosophy must be evident. Students are placed in, for example, Barr soft drinks, a fish farm in Skye and Highland Radio Scotland.

The industrial experience aims are:-

- to understand the company's organisational structure, economic principles, qualities standards, goals and expectations.
- give relevance to school curriculum, pupil subject choice and career guidance
- personal and professional development
- make connections and contextualise the school curriculum in a relevant and interesting way, using ideas and stimulus materials based on the experience

Balance and Integration

The design and technology aspect of the course is balanced with education studies, through Managing and Teaching Learning & Assessment modules (MaTLA) and school placements of an increasing duration and intensity towards the final years. We have addressed the concern over short four week placements of the previous B.Tech. Ed. Over the four year programme students will experience three schools and one associate primary school (for observation and teaching). Initially a series of one day

visits to school, returning to the school for a four week block in that school at the beginning of second year. In third and fourth year there are extended placements of 10 - 12 weeks, during which time they are responsible for devising, teaching and evaluating a 7 - 9 weeks programme of work in its entirety, in line with the school scheme of work.

There is a consensus of opinion in favour of the primary liaison, from both schools and students. It provides the students with greater understanding of a the education system being a continuum. Students are introduced to a wide variety of teaching methods. The primary experience illustrates, as one student noted, 'the cultural change the pupils go through moving from primary to secondary'. Comments received from students indicate the advantages of the primary placements:

> *'It was good to experience to watch how a primary school operates and how 5-14 curriculum is introduced to pupils.'*
>
> *'I think it is important to have an insight into pupils experience and environment, prior to attending a secondary school.'*

Most schools recognise the need for awareness and understanding of the primary sectors and place the increased importance of the primary visits in direct relation to progression of the 5-14 National Guidelines

Transferability: a way out

Recognising that students sometimes make inappropriate judgements regarding their personal compatibility with teaching, the experiences provided by modules from both Engineering and Education permits a greater degree of flexibility than could otherwise have been afforded. Therefore, transfer from B.Ed Design and Technology to certain engineering courses e.g. B.Eng. (Product Design), with appropriate credit accumulation, is possible at the end of the first year and vice versa. This was

incorporated to overcome the disincentive to recruitment, resulting from the single career outlet of the B.Ed course, namely technology teaching.

Flexibility has, in the initial two cohorts proved successful - one male and one female each with a full group of credits have opted to transfer to Product Design Engineering on completion of the first year. The serial observation placement in school gave them a flavour of teaching and they came to the conclusion that they did not feel sufficiently convinced to continue on the B.Ed D&T

Recruitment

Entry to B.Ed Design and Technology requires Scottish Highers in English, Mathematics and Technological Studies or Physics. Scottish Vocational Education Certificate (SCOTVEC) or module equivalencies or pass in the Scottish Wider Access Programme, Access to Science and Technology, are also considered.

The age range of the students on B.Ed D&T is between 18-50 years old with the average student age currently at twenty-nine years old. Recruitment has brought together students from a diverse range of backgrounds from, outdoor education, sub mariner, fire fighting and those direct from school.

Each applicant with appropriate qualifications is invited to interview. This permits an assessment to be made by a panel comprising of course lecturer and a practising teacher. The panel considers each interviewee on individual merit in relation to commitment, motivation and suitability for teaching design and technology.

However the conversion rate from interview to registration is poor (10:1) and for offers converted into places being accepted 7:1. (based on 1993 and 94 figures).

Some specific problems have been identified:

- A new course requires an increased profile to attract attention.

- The change of name has led to some confusion. The established name of the original degree, B.Tech.Ed , was taken up by Glasgow when the new course adopted the title B.Ed Design and Technology (Strathclyde). This has led to some confusion.
- Marketing strategies need to be re-examined in relation to the new competitive climate of Higher Education.
- Nationally, students are not achieving the required level in Mathematics. Billet & Owen (1992), at Brunel, addressed a similar issue of students applying to the Industrial Design course without the necessary qualifications. They were alarmed that applications from students with maths was 'on a straight-line trend to zero for the year 1995.' As they gradually lowered the accepted admission standard from 'A' level to GCSE maths, there was a complimentary remediation mathematics programme established. This was devised in such a way so as to accelerate the students learning of maths necessary for students of industrial design.

  This option is not one that is currently open to the University of Strathclyde, B.Ed D&T, due to the requirement of the education students to complete generic engineering modules of a set standard. There is, however, a 'Peer Assisted Supplemental Studies' (PASS) programme underway. A formally recognised system which assists and supports students by addressing weaknesses in a range of subjects including mathematics, analogue and digital electronics and structures. Concern over maths is illustrated by a potential applicant commenting that although keen to teach technology, the level of maths required for success in the course indicated that it might be 'too challenging.'

- A change in the mechanism for application (1994) has greatly reduced the conversion rate. e.g. 1992, under the unique TEACH application system for teacher education courses, there was a conversion rate of 50 %.
- Teaching morale is fairly low and there seems to be a dissuasive attitude towards pupils interested in pursuing a career in teaching.
- For those with strengths in maths, physics or technological studies and design an initial specialist degree is often thought more appropriate. This can be followed by a postgraduate certificate in education, 'if you really still want to do teaching, but keep the option open to pursue a career in industry.'
- Careers and guidance staff in school and community need to be more aware of the changes Design and Technology has undergone and is still undergoing, to ensure a shift from the attitude that it is of lower academic standing. There is much to be done in this area on a National level to support the local initiatives currently being explored.

Transferability : A way in

The course accommodates those students who bring with them prior learning and industrial experience by permitting entry to 2nd year and 3rd year to those holding appropriate certificates (HNC in mechanical/electrical engineering for second year entry or HND in mechatronics or integrated/mult discipline engineering plus industrial experience for direct entry to third year). Students with appropriate industrial experience may also be exempt from industrial placements although submission of an assignment is still required. Students from other courses e.g. electrical and electronic engineering have also transferred course successfully.

In such cases they are required to attend a 3 week bridging course in order to satisfy the legislative requirements of the General Teaching Council for Scotland and MaTLA1 (including school observation and teaching days), and introduce the aspects of the course which their prior learning has not adequately covered.

This has proved to be popular route into the B.Ed Design and Technology. Each cohort to date has been supplemented by six direct entrants to second year, bringing with them experiences ranging from the telecommunication industry, CNC operations, to drawing offices.

Gender Issues

The new course also aims to encourage a greater recruitment of women into the teaching of technology. At present in Scotland 3.8 % of the registered technology teaching force is female.

Over the past five years, there has been steady growth in the number of girls being presented in most technological subjects at school level. (Appendix C) There is sustained interest from girls, (approximately 20% of presentations) at both standard and higher grade, of the revised syllabus for Craft and Design. The introduction of Standard Grade Graphical Communication has increased the numbers of girls from 12.8 % of all those taking technical drawing in 1990 to 21.8% of presentations in 1995. There is a similar picture for Higher Grade Graphical Communication which was introduced in 1994. The figures for Technological Studies, however, are not so encouraging. Both Standard and Higher grade, after initial interest during the pilot years, are attracting few girls, peaking at 6 % of all presentations.

Of those that are selecting each of these technological subject areas, girls are achieving certification of an equal standing as, or better than, the boys. E.g. Higher Grade Craft

and Design (revised) 1994, 64 % of boys achieved A-C certification compared to 75% of girls. Although statistics show an improvement in the gender imbalance, there is still much to be done to encourage girls to develop their technological literacy and explore possible, future technological careers. Therefore there is no room for complacency.

Current figures for recruitment and retention of students to the B.Ed. D&T show that present 14 % of 3rd year, 19 % of second year, 29% of first year are female. On interpretation of these figures, one could conclude that the rationale of the B.Ed. D&T course is attracting more females. However, the female ratio is greater due to the poor recruitment of male students. Numbers have dropped significantly.

Learning Approaches : Responsibilities

Although technical, engineering problem solving remains an integral aspect of the approach the B.Ed D&T involves a broader perspective of design centred activity. It is a course which emphasises the purpose of design and technology activity as being an active study which encourages application of knowledge, skills and understanding already acquired, whilst pushing the learner / designer to acquire further knowledge, skill and understanding which the context and design problem demands. Design and Technology is, after all :

> 'an active study involving the purposeful pursuit of a task to some form of resolution that results in improvements (for someone) in the made world.....' APU(1991)

In order to appreciate that something which is regarded as an appropriate and effective solution for some may be a creator of problems for others, the course promotes the need to evaluate the impact and consequences of D&T activity on society, environment, lifestyles, economics and politics, appraising the influences and factors that are involved in any design decisions.

We see our role at Strathclyde as one in which we encourage our students to strive for the ideal in a feasible way. We urge the students to give their pupils a sense of relevance for their learning by contextualising concepts. They must provide the opportunities for pupils to apply their knowledge and newly acquired skills and develop their sense of wonder, investigate interests and explore personal perceptions. Each of their pupils must be engaged in thinking and doing - cultivating individual talents and capabilities and providing educational experiences that are themselves more than training.

We aim to prepare our students with a balance of the vocational training aspects and development of competences, accompanied by intellectual understanding through a broad definition of education.

To increase breadth, the students choose two electives each year. These are selected form a menu including, for example, Forensic Science, Environmental Awareness through Photography, European Studies, Improve Powers of Communication, Tourism, etc. Evidence that the concept of electives is beginning to take effect is illustrated by a comment from a current 3rd year B.Ed D&T student:

> *'Electives are very informative and can sometimes assist in other aspects of the course.'*

However, the restrictions of core curriculum time-tabling are such that many students are disappointed by the actual choice of electives that are compatible with the identifiable elective sessions. Efforts are continually being made to develop and identify new electives. There is a year on year improvement of choice and flexibility.

Each student must create a personal informed rationale and vision for design and technology education based on readings, practice, values and experience. One which ensures, as teachers, they do not 'teach to the test' at the expense of the process based

learning experiences which have the potential to change attitudes and develop confidence in learning and understanding.

Technology Education must have significant learning value. We must go beyond a check list of skills and competences. This is a concept which often causes a great deal of concern in many teachers of technology and students. There is no clearly defined parameter within which the 'subject' sits.

Although guidance is required to provide a cohesive scheme and a direction, it is not a subject that one can define and provide a definitive list of what must be learned or taught. The rationale agrees with the Assessment of Performance Unit :

> 'To predetermine the knowledge and skills that are needed to tackle a task is to deny the nature of the activity' (4.8 APU, 1987)

Indeed, design and technology educators should try to understand that very often 'the knowledge required is that which a pupil (or student) identifies as necessary for the task: it cannot therefore be pre-determined.' (4.13 APU, 1987)

To each design project there is a range of resolutions rather than one right answer. Students, therefore, are responsible for their own learning and professional development, through the application of skills and knowledge, reflection and exploration of issues. They must develop confidence in their own quality of thought and proposals.

The lack of definition and specific rules or boundaries within a design context or initial design brief is seen by some students as an opportunity for research and analysis, a challenge to explore the possibilities. There are others, however, who are accustomed to a very different, more constrained approach. These students have, normally, had specific industrial experience in which they were working to a tightly defined, predetermined specification. Their concern is expressed in terms of :

'Design assignments are vague';

'A clear example of what is required is not given';

' I feel uncomfortable, not with the actual designing but the what is expected before that';

'Design and make - unsure what is required.'

Such students do not feel comfortable in open-ended design tasks which for example, demand that they define the specification and provide the research to support decisions made.

In addition, some students tend to be over anxious about the requirements of assessment, which they see as the key importance over the actual process of learning. This approach often results in a surface learning. A student centred, resource based course may not, initially, suit those who have previously succeeded in assessments through repetitive rote learning or last minute cramming.

Pre-occupation with assessment and measurement can distorted the concept of learning and result in missed opportunities; an education that is no more than a series of hoops to be jumped through at request. The Assessment of Performance Unit advised that assessment in the field of Design and Technology must maintain a balance between

> 'conflicting requirements of encouraging pupils (students) to develop thoughts naturally whilst at the same time permitting judgements under pre-determined headings.' (APU 2.13 1987)

There are modules of the course, which on reflection, have also fallen into using a mark scheme with too many small component parts involved. Although it was devised to discipline the students into working hard and submitting all work, the result is not only overly complex but detrimental to the quality of work.

Students feel that the emphasis should not be on the quality of finish of their submissions as this can :

> *'discourage students from attempting to learning to learn new disciplines and from being ambitious in ideas. Effort should be given more weighting.'*

A non-assessed piece of work may well have encouraged greater depth in the learning, greater sense of exploration and more openness to show initiative, curiosity and independence. Students have, in some cases, tackled something of a very easy nature in order that they can achieve a high grade. Feed back has therefore to address the meaning of a process based course and encourage the students to take greater responsibility of their own learning.

Culture of Research and Development

> 'A well trained teacher is useful but an educated one is better - one whose skills are informed and applied through broader intellectual grasp of the issues of the nature of learning, of the social context of the child, and of values worth pursuing.'
>
> Richard Pring in 'Context of Education : Monastery or Market Place' (p.34)

Achieving quality in technological literacy depends on continual personal and combined research, questioning and communication. A climate of debate should prevail; one in which professional and personal development is sustained by all those parties involved in this process. Argyris & Schon, (1974) promote a model of learning which encourages the individual to maximise his/her uniqueness. By arriving at different goals from those of others in 'conditions of openness, trust and risk-taking' (Argyris & Schon, p.103) the individual should feel free to discuss these differences openly. This development of a learning culture where students 'want to become more skilled at being reflective about their own actions and to increase their competence in creating their own theories of effective practice'(Argyris & Schon, p.192) is of central importance to a teacher education course.

Subsequently, the course acknowledges, and has at its foundation the following :

- that teachers must be self-monitoring, self-evaluating reflective professionals who can operate in a changing and complex, broad reaching and ranging world;

- that teachers should have the ability to work as part of a team with colleagues, parents and those involved with the school community;
- that there are very rarely right and wrong answers to design and technology activities and teachers need to be prepared to cope with levels of uncertainty - perhaps the fear of saying 'I don't know' needs to be dispelled and the value of saying, 'I don't know but I think we can find out from .....' expounded;
- the importance of placing technology in the context of society, understanding cultural diversity in society and recognising that there may be conflicting factors and influences on design because of the wide range of values and needs of human beings.

Evaluation mechanisms

The nature of this evaluation is mainly to focus on the course rather than the teaching, although, obviously the two are interrelated activities and inevitably some views on teaching were obtained. The wide range of teaching strategies which are incorporated into the course as a whole will be the subject of a formal review at a later date. At present these include lectures, labs, seminars, design and graphic studios, tutorials, and workshops (practical and education).

Feedback is continually requested to evaluate and monitor student and tutor responses. Schools provide feedback on an informal basis when tutors visit students on placement and through a more formalised basis at the end of placement.

The evaluative mechanisms used to collect both qualitative and quantitative data are:

- staff-student meeting between year group representatives and course director once a semester where matters of concern are reported and discussed;

- overall numerical ratings questionnaires on all modules, sample groups of first and third year only ;
- course monitoring meeting between the course committee and the course director once per year;
- specific independent evaluations of modules which are not connected to other evaluative mechanisms. The course construction is one where the teaching is devolved to individuals, each operating within the collective responsibility for the course.
- In addition, for this interim course evaluation, students and school, were requested to complete a questionnaire (Appendix D) which aimed to gauge whether the aims of the course were being met . This resulted in a student return of 55 % and school return of 47%

Issues and Concerns

Cohesion and integration of the many contributions of different lecturers to the range of modules is central to the success of the B.Ed D&T. The D&T students, in some cases, attend lectures in company with many other degree students (e.g. engineering, marketing), so some classes are not planned with the specific needs of the B.Ed Design and Technology students in mind. However, there are annual team meetings to share, review and inform each other about the various inputs and modules.

Related labs and tutorial sessions are provided by the Faculty of Education to support the engineering lecture inputs. The original intention of this was to enable the students to explore the content using equipment more familiar to schools. Feedback from students in the early stages of course development and implementation indicated a need to maintain close liaison between lecture and laboratory tutors to ensure cohesion.

There are obviously implications for continuity of staffing and provision of opportunities for liaison.

The success of this approach depends on relevance to school curriculum being made explicit. The students should be able to appreciate the connections and understand the benefits of the 'theoretical' inputs in relation to the integrated teaching methodologies of D&T. The success of individual students very much depends, not surprisingly, on individual determination, motivation and confidence.

Student evaluation of the credit modules of the B.Ed D&T, for 1993, against a range of criteria, from quality of handouts, support presentation assignments, etc. illustrates the subjectivity of any evaluation exercise. It is apparent that the subjects for which they achieved a high grade, they score highly and for those they did poorly, they score low against a range of criteria. The modules which are more directly related to the school curriculum are rated more generously, with, for example, 90.91% of students finding computing labs helpful and 91.66 % rating the manufacturing workshops helpful.

Assignments do not always inspire all the student all the time. This is illustrated by the criticisms of the assignment topics for design and manufacture which include :

> *.....failed to stimulate me personally. Thus the work I produced was of mediocre quality. Otherwise, a good course though.'*

> *'....were not stimulating enough. I feel that making a table or a nice piece of furniture would have been more beneficial to us. When manufacturing, it would be better to produce something that could be used in future i.e. table, etc.'*

Schools have indicated that they would prefer assignments to be focused on the

> *'production of materials for schools so that they can make a long term influence in a department through their fresh ideas'.*

The extended third year placement programme allows for opportunities of this nature to be explored as does the projected plans for Design 5, presented in the final year.

Perceptions of Personal Strengths and Weaknesses : Students

Overall there is evidence of the students growing in confidence and developing a greater understanding over a wide range of aspects. The aspects which show the most marked development are related to teaching. The students perceive themselves to be making progress in the related aspects of planning a teaching input, confidence in communicating with a whole class and preparing handouts, visual aids, etc. For example, the returns of the questionnaire exploring individual perceptions of strengths and weakness on embarking on the course compared with the present perceptions, illustrate that although all students feel that they have made progress in the preparation of teaching inputs, 57% still believe it to be one of their weakest areas. This contrasts with the school perception, 83% of whom indicated that they believe the students to be strong or very strong in this area. All of the students have indicated that they are strong in communicating with a whole class. The school perception of this aspect does not rate the students quite as highly.

There is also marked progress in the students awareness and use of resources and stimulus materials and ability to use their initiative. 81% of students now place themselves as strong or very strong in both these aspects. This is an increase of 67%. The elements in which the first two cohorts of students perceive themselves to be weakest in, at present, are design, control technology, teaching and preparing inputs and teaching strategies. The third and fourth year of the course focuses on the further development of these elements. An end of course evaluation using the same mechanism will enable a conclusion to be drawn as to the effectiveness of addressing these

aspects. The relevance of the more 'theoretical' aspects in which the students believe they have made less progress, should become more apparent when they have the opportunity to apply the technologies in extended school placements or design projects.

Considering the nature of design and technology, one would have expected that *all* students on a design and technology course would have thought of themselves as having a strong sense of curiosity rather than 80%.

More workshop time is demanded by students and schools require students with a high degree of competence in manufacturing and realisation skills. Raising standards and competence in manufacturing requires hands-on time to develop confidence and experience. It is important, however, to maintain an appropriate balance across all aspects of the design and technology curriculum. The evaluation exercise has raised a variation in perception of strengths in this respect. Whereas 66% of the students rate themselves as being strong or very strong in manufacturing skills, 61% of schools indicated that this is an area of weakness for the students, at this stage. That traditional craft manufacturing is central to the teaching of design and technology, is a view held by many schools. It will take many years to encourage technological literacy through education which encompasses a broader remit than manufacturing and manipulative skill development through training.

Awareness Issues

The returns from the more formal evaluation from our placement schools have raised a rather serious issue. In spite of communication efforts, many schools seem to be unaware that there has been a change of degree programme and with it a change in rationale, aims and structure. Tutors, students and teachers believe that for there to be

a more beneficial partnership in the development of technology teaching and the preparation of teachers for the future, there must be information on course content, structure and assignments. Schools do receive outline information on the course structure, the individual student record of workshop practice and the arrangement for the placements. However, the majority of the schools and students agree that increased awareness and information, together with improved communications, would clarify expectations of knowledge and capabilities.

Students perceptions of the benefits of increased awareness of the course by schools include:

> *'staff would know what to expect of you and what you should be capable of.'*
>
> *'schools would know what level of work the student is at during placement.'*
>
> *'schools would be able to give a choice of lessons that is (of students) standard.'*
>
> *'schools would know where they can offer help and / or advice.'*
>
> *'.....help schools to provide a more suitable programme / timetable (for student).'*

The placement host schools cite similar reasons for requiring additional information :

> *'if schools know what knowledge or experience a student has gained then they will be better placed to match this against their expectation of a student during placement.'*
>
> *'give technical departments a better idea of what the students are capable of.'*
>
> *'to understand what is being asked of students.'*
>
> *'to indicate student strengths.'*

The general consensus is that more informed the school personnel are the more they can contribute to the development of the student.

Conclusion

There are a number of 'teething' problems with all new initiatives and the B.Ed Design and Technology acknowledges it has had its share.

In conducting this evaluation we realise that students do have their own perspectives on courses, their personal reasons for viewing them in certain ways and their own reasons for being there. Evidence gathered from the various sources suggests that we may a have problem with the students' perceptions of the relevance and importance of certain points of the course and of the level to which they are expected to perform.

It seems astonishing that student teachers are complacent about intellectual rigour and would prefer to learn at school level to teach school level.

Therefore, we have recognised the qualitative nature of the exercise and this has revealed to us the varying student and school perceptions of what a course on Design and Technology Education should entail. It appears, from the evaluation survey, that the students have a general lack of educational awareness, and in particular of design and technology issues. A raising of awareness of the rationale and the overall aims of the degree course should be an immediate aim. This should serve to strengthen the partnership between the schools we depend upon to provide teaching experience for our students and make more explicit the connections between the individual components of the course and the holistic nature of design and technology education at school.

Retrospective evaluations do not always benefit the current cohort, but subsequent changes for others which can be made as a direct result of student and schools being involved in an interim evaluation should be considered worthwhile.

Greater public awareness of the B.Ed Design and Technology programme would enable the public in general to have an increased understanding of the technological literacy that we are striving to provide for our school children, future teachers and future citizens.

This may, in turn, help to attract applications from a broad range of appropriately qualified candidates who are committed to the development of others in a rapidly changing society.

Richard Pring (1994) urges

> 'To educate, one needs to get the learner on the inside of different forms of understanding whereby yet further questions can be asked and new enquiries embarked upon.' (p.33)

Pring continues to distinguish between training and education by stating that it is through education new perceptions and imaginings are made possible. The University of Strathclyde B.Ed D&T course strives to prepare newly qualified design and technology teachers who have a firm grasp of the basic concepts and principles and have experienced a broad range of learning activities which has deepened their understanding of a technological society in the broadest educational sense.

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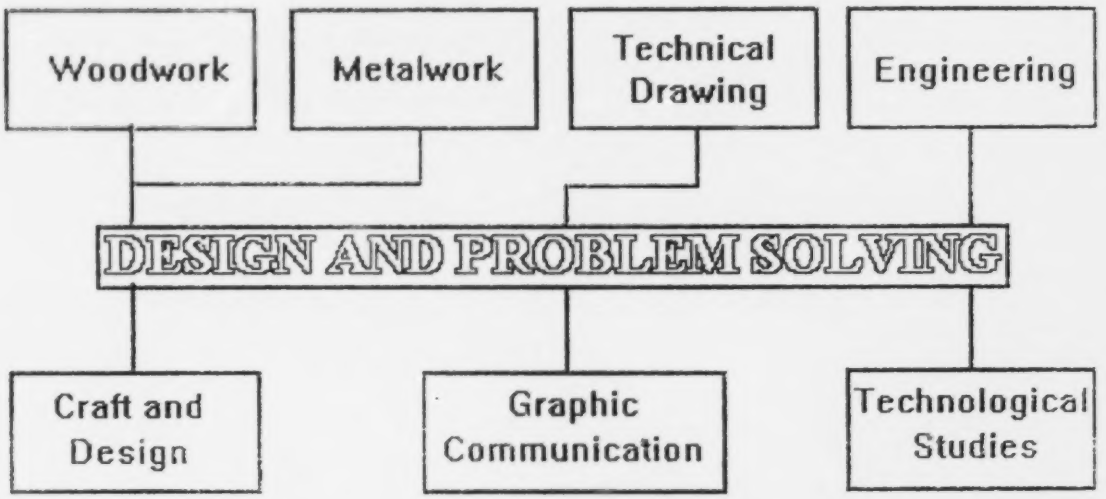
Graham J. Murdoch is a lecturer in the Department of Mathematics, Science and Technological Education, in the Faculty of Education at the University of Strathclyde. He has taught in secondary schools through the changes that have occurred within the subject of Technical Educational. He has a particular interest in the organisation and running of Young Engineers' Clubs and is a member of the national steering committee. He is currently involved in research looking at the future career prospects of 'Young Engineers' club members

Appendices

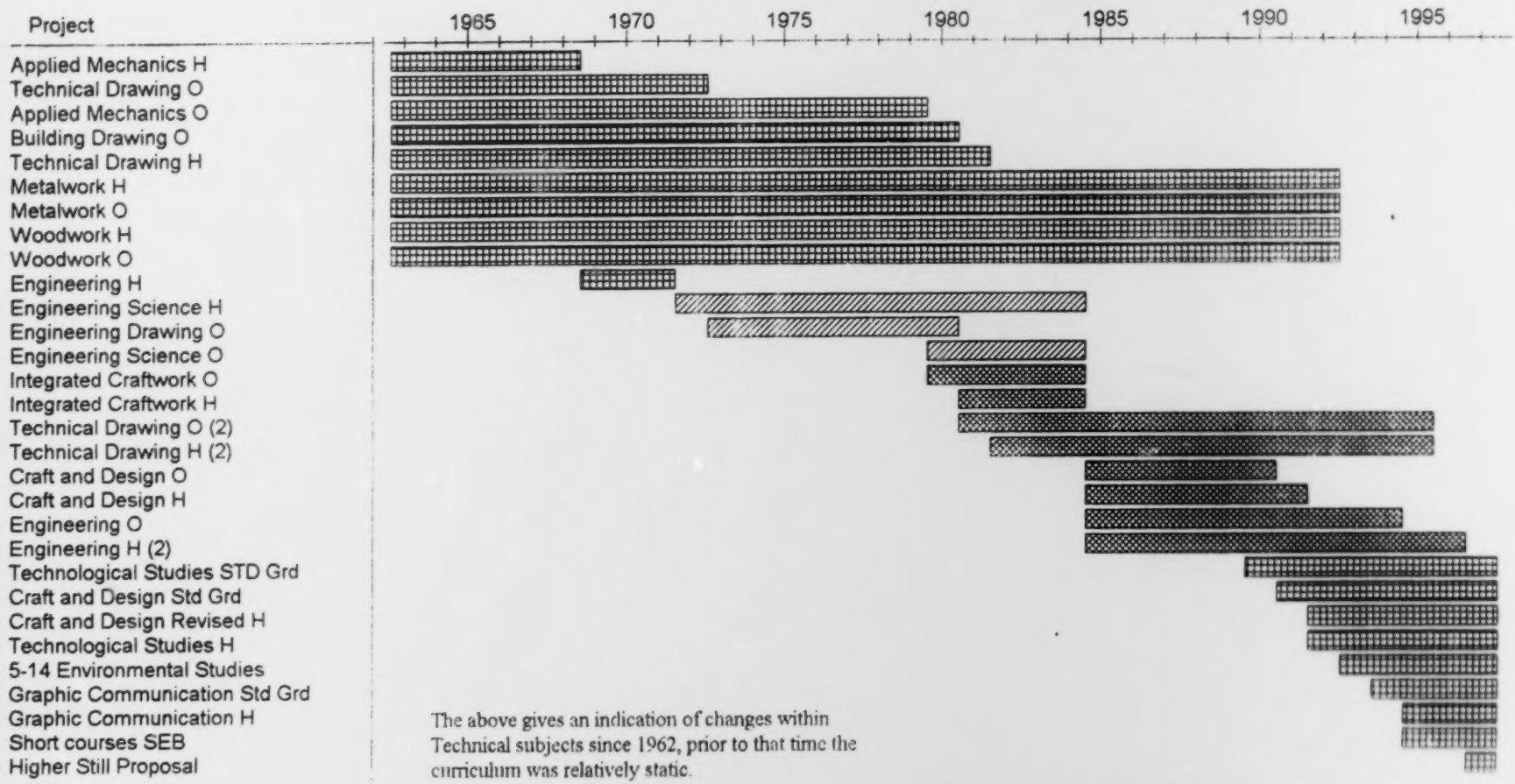
Appendix	**A1**	Changing Face of Technology Subjects
	A2	Chronological Changes in Examination Subjects presented by Technical departments
Appendix	**B**	Course Development Team
Appendix	**C1**	Presentation of girls in design and technology subjects 1990-1995 in comparison to boys - Technological Studies
	C2	Presentation of girls in design and technology subjects 1990-1995 in comparison to boys - Graphical Communication
	C3	Presentation of girls in design and technology subjects 1990-1995 in comparison to boys - Craft and Design
Appendix	**D1**	Interim questionnaire analysis
	D2	Interim Evaluation Questionnaire to School
	D3	Interim Evaluation Questionnaire to Students

THE CHANGING FACE OF TECHNOLOGY EDUCATION



Mathematics Science and Technological Education

curriculum changes in Technical Subjects 24/11/95 - Page 1



The above gives an indication of changes within Technical subjects since 1962, prior to that time the curriculum was relatively static.

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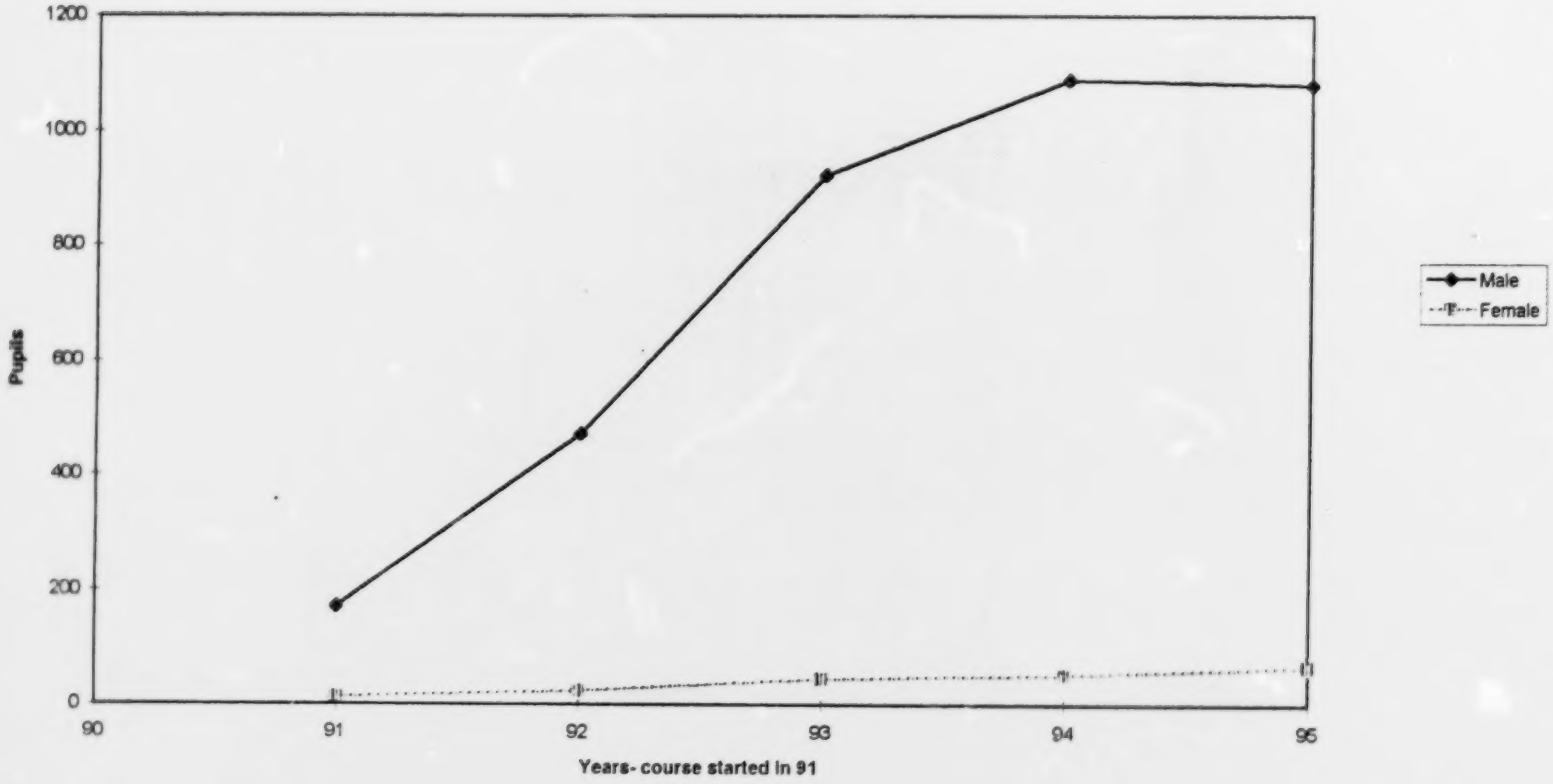
Course Planning Team

R.T. Morrison	Jordanhill College	Course Director B.Tech.E. (1985 - 1993) Head of Division of Technology Member of joint working party for Revised Higher Craft and Design
W.Lindsay	Jordanhill College	Course co-ordinator B.Tech.Ed. (1987-1993) Member of Joint working party for Technological Studies
I.Craig	Jordanhill College	Lecturer Secretary of joint working party for Graphic Communication, National Development Officer for Craft and Design
P.Elliott	Jordanhill College	Lecturer / principal teacher of Design and Technology
W. Ramsay	Jordanhill College	Snr. Lecturer, Division of Education &Psychology with responsibility for B.Tech Ed.
P. Martin	Jordanhill College	Snr. Lecturer, Division of Education &Psychology
W. Ion	Strathclyde University	Faculty of Engineering Leader of Product Design Engineering Degree Course Member of joint working party of Graphic Communication
W. Brown	Strathcylde Region	Adviser in Technical Education, Glasgow Division
G. Meiklejohn (to Sept. 1992)	Strathclyde Region	Principal Teacher Technological Education
A.Venters (from Dec.1992)	Strathclyde Region	Principal Teacher Technological Education
L.Biagioni	Strathclyde Region	One of the first women graduates from B.Tech. Ed.
J. McCay		Snr. computer system engineer

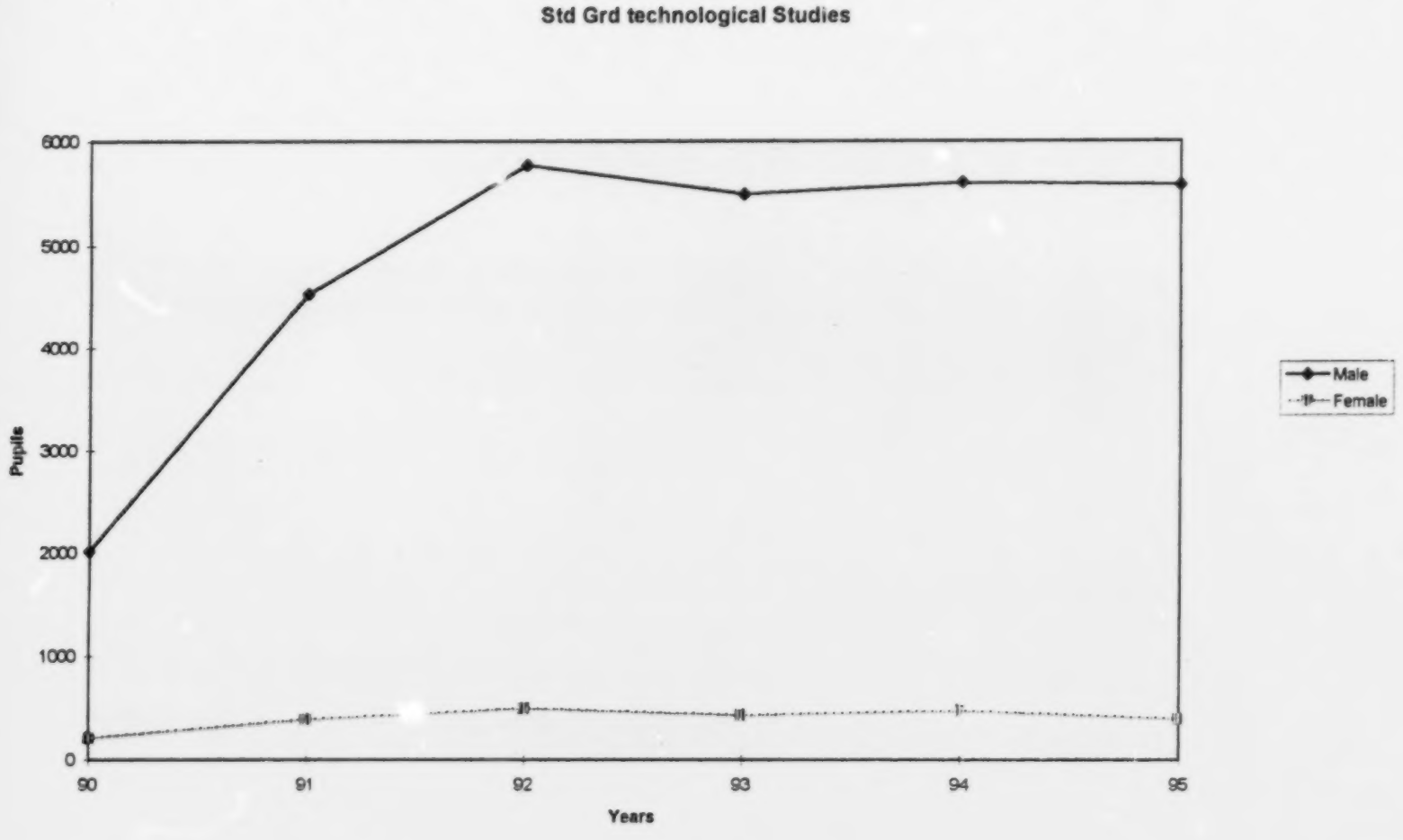
Gender Balance

Higher Technological studies



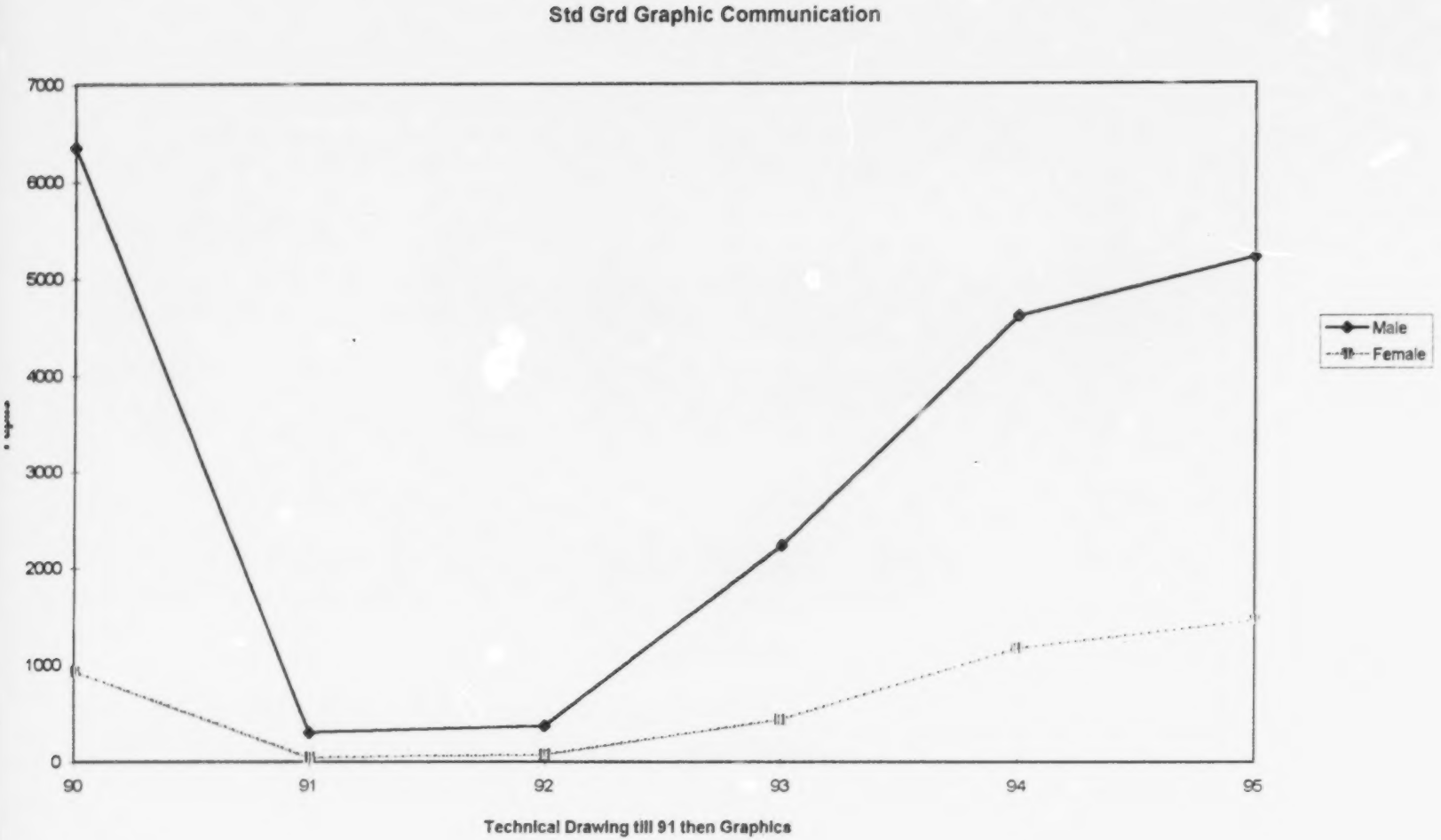
Appendix C

Gender Balance

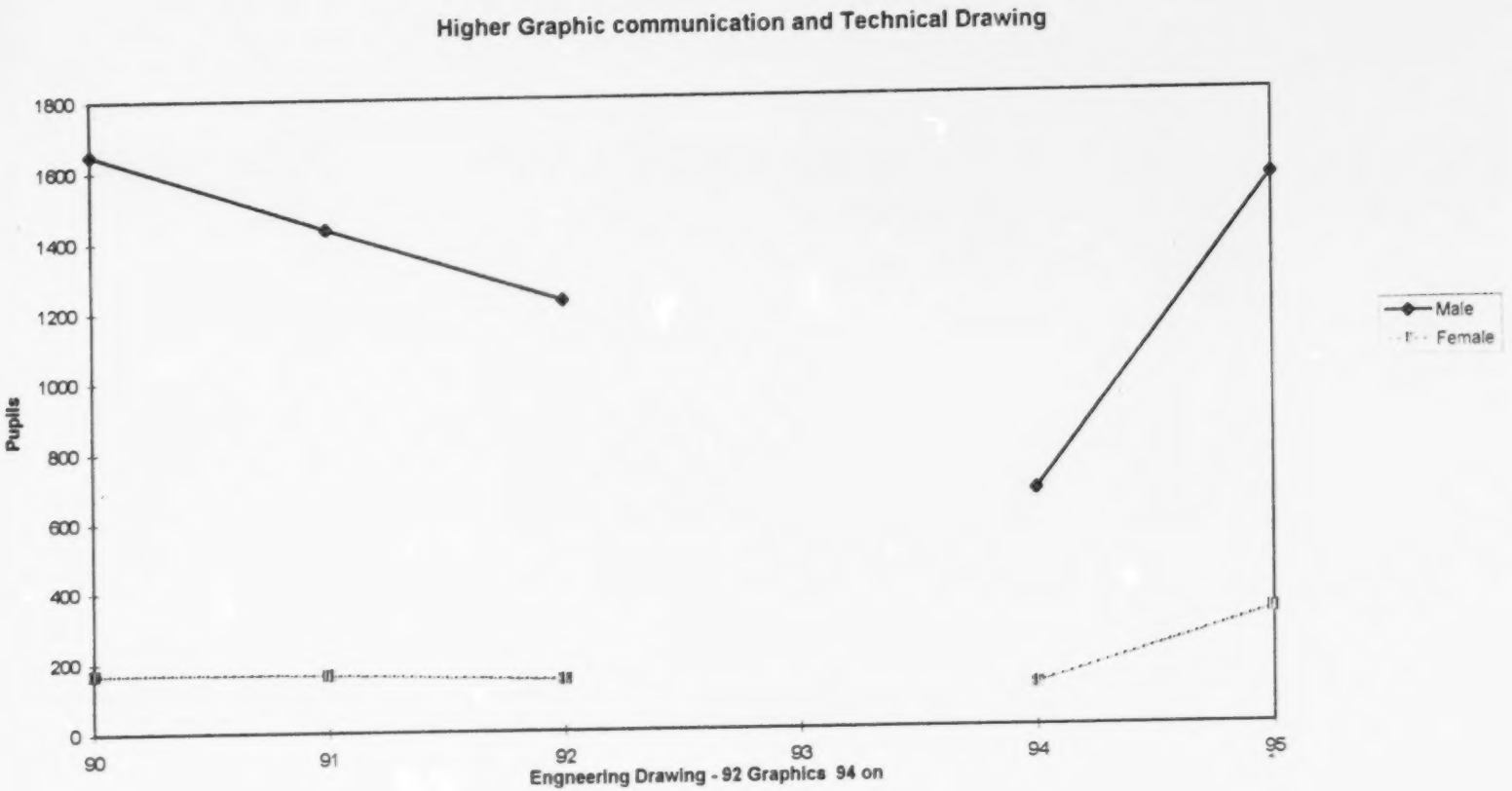


Appendix C

Gender Balance



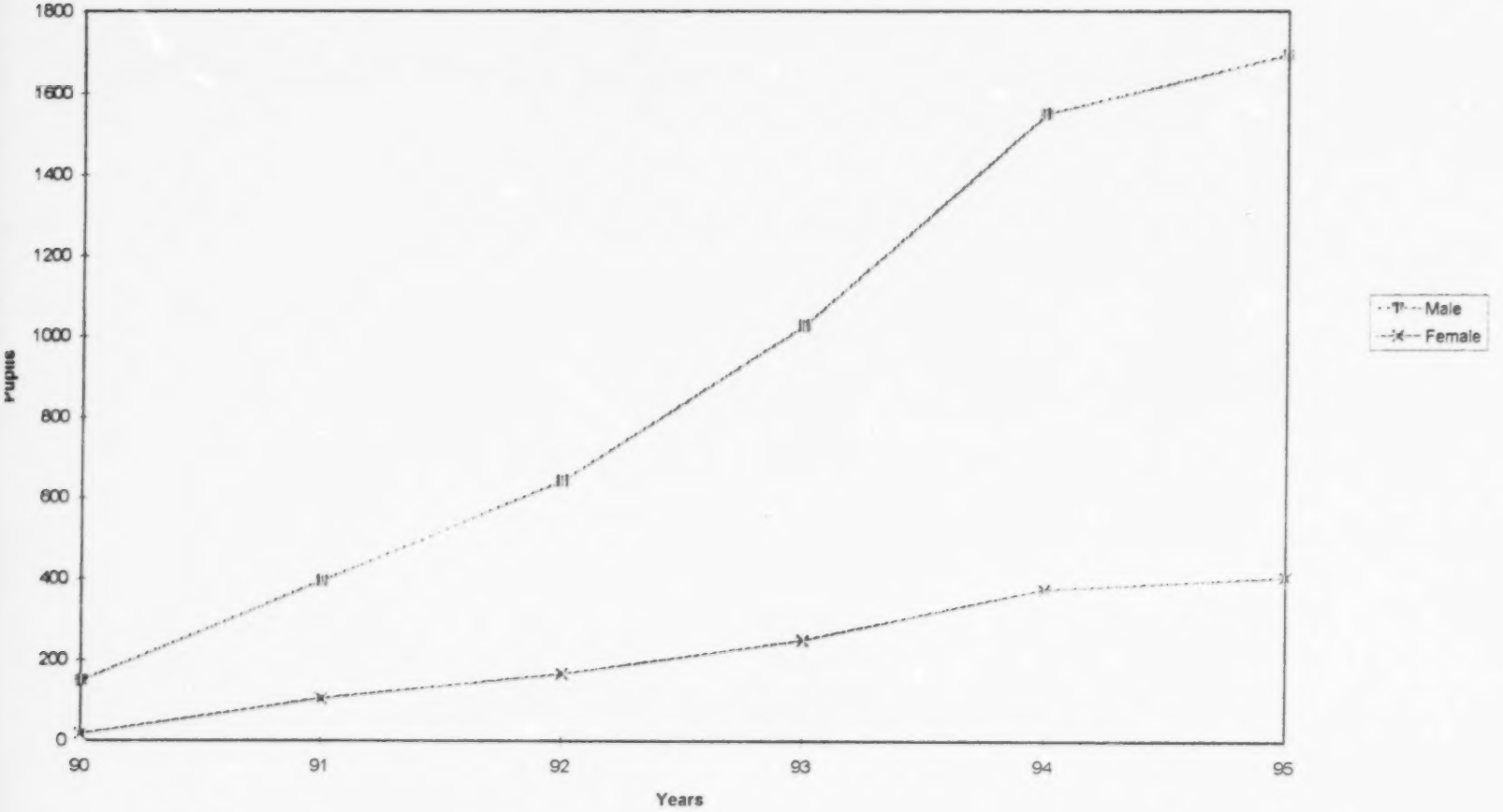
Gender Balance



Appendix C

Gender Balance

Revised Higher Craft and Design



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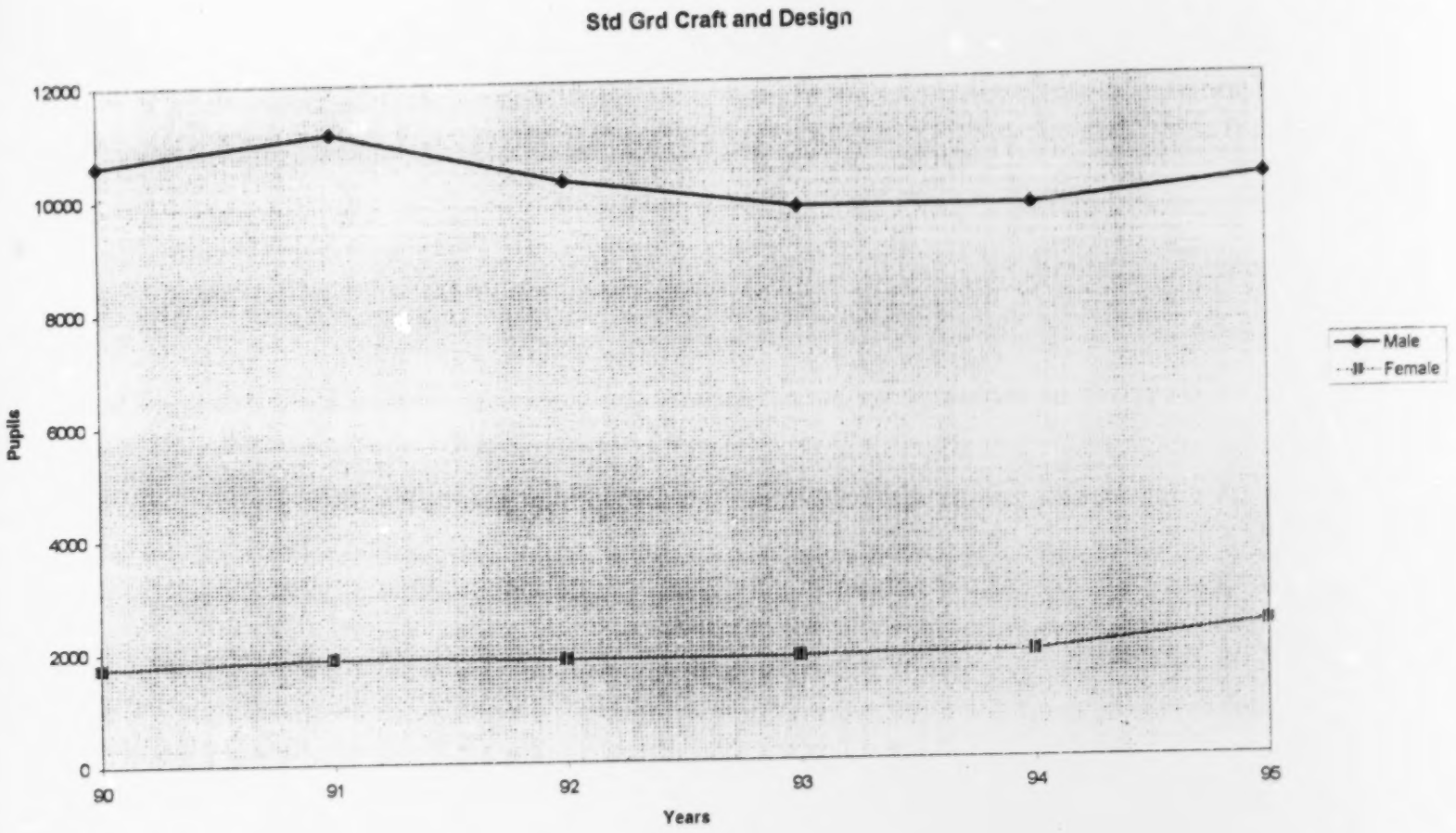

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Questionnaire results expressed as modes

			Student Responses Re start of course			Student responses Re present time			School evaluations in Modes for scores of	
			2 or less	Greater 2	Average	2 or less	Greater 2	%increase	2 or less	Greater 2
tanding of design approaches			19	2	2.3	13	8	29	5	11
logical capability		electronics	17	4	2.5	8	13	43	6	12
		pneumatics	16	5	2.3	10	11	29	5	12
		structures	13	8	2.9	6	15	33	6	11
		mechanics	14	7	2.8	4	17	48	5	12
		control tech .	18	3	2.2	12	9	29	7	10
ence in communication	with pupils	one to one	12	9	3.5	0	21	57	0	17
		whole class	19	2	3.1	3	18	76	4	13
		small group	15	6	3.5	0	21	71	0	18
	with staff	one to one	8	13	3.7	0	21	38	0	18
		small group	11	10	3.3	1	20	48	1	17
ing teaching inputs (lesson)			21	0	2.5	12	9	43	3	15
ness to practise			14	7	3.0	4	17	48	2	16
ness to listen			4	17	3.5	2	19	9.5	4	14
ng strategies			20	1	2.5	11	10	43	9	9
acturing skills			11	10	2.9	7	14	19	11	7
cal communication skills			19	2	2.6	10	11	43	9	9
ness of media, resources and materials			19	2	2.7	7	14	57	5	12
ping and sharing new ideas			15	6	2.9	6	15	43	3	15
ring handouts, worksheets, visual aids, etc.			18	3	3.0	4	17	67	2	16
resources / stimulus materials			19	2	2.6	6	15	62	3	15
uting skills	CAG include DTP, CAD		19	2	2.6	9	12	48	7	10
		WP	16	5	3.0	5	16	52	3	14
		CONTROL	19	2	2.0	15	6	19	7	10
ating design and technology			21	0	2.4	12	9	43	6	11
g of D & T in context of society and work place			19	2	2.6	8	13	52	7	9
ssing value issues in design and technology			19	2	2.3	11	10	38	4	12
ying initiative			17	4	2.9	5	16	57	2	14
onitoring			14	7	2.8	8	13	29	3	13
valuating /appraising			17	4	2.8	7	14	48	4	14
endence of thought and action			16	5	2.8	5	16	52	4	14
lity			11	10	2.9	6	15	24	1	17
ility			4	17	3.3	4	17	0	3	15
ness to grasp opportunities			8	13	3.0	2	19	29	4	14
ness/ confidence to contribute			11	10	3.2	1	20	48	2	16
ness to co-operate			3	18	3.5	1	20	9.5	0	18
attitude towards pupils			4	17	3.5	0	21	19	1	17
ness of educational issues			19	2	2.8	7	14	57	7	11
ness of design and technological issues in education			19	2	2.6	9	12	48	9	9
tial to be a competent teacher of d & t			17	4	3.1	3	18	67	2	16

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B.Ed Design and Technology : Interim Evaluation 1995

We are currently undertaking an evaluation of the four year undergraduate Design and Technology degree at Strathclyde University on which the first cohort embarked in 1993.

We would appreciate your assistance in this process. You may have had experience of our students for their first year serial vision placement of 12 days, followed by the 4 weeks teaching practice placement. You may be accommodating a third year student for the 10 week teaching practice block at present. It may be that you have accommodated students involved in each of these. Therefore, your observations and comments are of great importance to us, in order that we may assess the relevance of the campus based work to the teaching placement.

We are aware that each student brings with him/ her many aspects that the university course cannot claim responsibility for. However, the evaluation intends to cover recruitment, prerequisites and interview procedures. Any comments you share with us can be looked at with this in mind for future selection and admission.

1. How many B.Ed Design and Technology students have you accommodated in your dept. since the degree began in 1993 ?

1st year serial placement	
2nd year 4 week block	
3rd year 10 week block	

2. Consider the timing of the placements

Year 1: School term 2/3, 12 day serial visits

Year 2: School term 1 (Aug. / Sept.) 4 week block practice

Year 3: School Term 1 (Oct. to Dec.)10 week block practice

Year *4: School Term 2 /3 (Jan. to May) 12 week block practice*

How do you feel about the timing of the school placements in relation to the continuing work of school calendar:

Do you consider the timing of the placements appropriate ?	Year 1	Y / N
	Year 2	Y / N
	Year 3	Y / N
	Year 4	Y / N

If you have answered 'No' for any of these, tell us why.

3. How do you feel about the length of the school placements?

	about right	longer placement	shorter placement
Year 1			
Year 2			
Year 3			
Year 4			

comments

4. Are the students well prepared for a 4 week placement in 2nd year following the 12 day serial visit experience ? Y / N

comments

5. Consider the observation and teaching inputs at the associate primary school.

1st year 4 days
2nd year 4 days

Do you see this as an important and relevant aspect in relation to teaching in a secondary school ? Y / N
Please, give reasons.

Is the length of the primary placement appropriate ?

	about right	longer placement needed	shorter placement needed	should be abandoned
Year 1				
Year 2				

Comments

6. We are interested in your perceptions of the strengths the students may have to offer schools whilst on placement. Consider the skills, attitudes and knowledge listed below and indicate where, on average, you would place the students you have accommodated in your department in general terms.
Relate them from 1 being very weak to 4 representing very strong.

• **Strengths of students :** *attitudes, skills and knowledge*	very weak 1	2	3	very strong 4
• understanding of design approaches				
• technological capability : electronics				
• : pneumatics				
• : structures				
• : mechanisms				
• : control tech .				
• confidence in communication with				
• *pupils* : one to one				
• : whole class				
• : small group				
• *staff* : one to one				
: small group				
• preparing inputs / lessons				
• willingness to practise				
• willingness to listen				
• teaching strategies				
• manufacturing skills				
• graphical communication skills				
• awareness of media, resources and materials				
• developing and sharing new ideas				
• preparing handouts, worksheets, visual aids, etc. .				
• using resources / stimulus materials				
• computing skills CAG include DTP, CAD				
• WP				
• CONTROL				
• integrating design and technology				
• placing of D & T in context of society and work place				
• discussing value issues in design and technology				
• displaying initiative				
• self monitoring				
• self evaluating /appraising				
• independence of thought and action				
• flexibility				
• curiosity				
• willingness to grasp opportunities				
• willingness to contribute				
• willingness to co-operate				
• caring attitude towards pupils				
• awareness of educational issues				
• awareness of design and technological issues in education				
• potential to be a competent teacher of d& t				

7. Consider the assessment forms / feedback reports you are requested to complete on the student.

Are the mechanisms used appropriate ? Y / N

If 'No', please describe any difficulties or problems with the existing form, approach etc.

Do you complete the forms in consultation with any other staff members Y / N

If 'Yes', who ?

Do you discuss the completed form with the student ? Y / N

Comments

8. How aware are you of the -	very	fairly	barely	not at all
• aims / rationale of the B.Ed D & T course at Strathclyde				
• structure of the B.Ed D&T course at Strathclyde				
• components of the B.Ed D&T course at Strathclyde				
• overall assessment criteria of the B.Ed D&T course at Strathclyde				

Do you perceive there to be a substantive change from the previous B.Tech Ed ? Y / N

How do you view the effect of these changes ? Please, comment.

9. Are you aware of the assignments students complete in 1st year ? Y / N

2nd year ? Y / N

3rd year ? Y / N

Do you think school departments should have more information on the

course work ? Y / N

exams ? Y / N

assignments ? Y / N

If 'Yes', to any of the above, of what interest would this be ?

10. Have you been satisfied with the students' knowledge and understanding of health and safety issues including execution in the workshop and studio? Y / N

Comments

Any other issues and comments which will assist us in our evaluation of the B.Ed (Hons) Design and Technology ?
Please record your thoughts and opinions freely !

Additional Comments

Thank you for your assistance in completing this questionnaire. We do appreciate your time and support .

You may complete this evaluation anonymously if you would prefer.

Name of principal teacher : _____

Name of School : _____

Would you be willing to discuss these issues further if required ? Y / N

B.Ed Design and Technology : Interim Evaluation 1995

We are currently undertaking an evaluation of the four year undergraduate Design and Technology degree on which the first cohort embarked in 1993.

We would appreciate your assistance in this process. You will now have had experience of school placement, in the first year serial vision placement of 12 days and the 4 weeks teaching practice placement. You may be undertaking your third school placement experience at present; the 10 week teaching practice block. Your observations, opinions and comments are of great importance to us, in order that we may assess the relevance of the campus based work to the teaching placement.

We are aware that each student brings with him/ her many aspects that the university course cannot claim responsibility for. However, in addition to evaluating the course we also intend to review the recruitment, prerequisites and interview procedures. Any comments you share with us can be looked at with this in mind for future selection and admission.

1. What year of the B.Ed Design and Technology degree are you in ?

(circle) 2nd year 3rd year

What year did you enter the B.Ed. Design and Technology course?

(circle) 1st year 2nd year

2. Consider the timing of the teaching placements

Year 1: School term 2&3 12 day serial visits

Year 2: School term 1 (Aug. & Sept.) 4 week block practice

Year 3: School Term 1 (Oct. to Dec.)10 week block practice

Year *4: School Term 2 /3 (Jan. to May) 12 week block practice*

How do you feel about the timing of the school placements in relation to the school calendar and faculty course work, assignments, etc:

Do you consider the timing of the placements appropriate ?	Year 1	Y / N
	Year 2	Y / N
	Year 3	Y / N
	Year 4	Y / N

If you have answered 'No' for any of these, tell us why.

3. How do you feel about the length of the school placements?

	about right	longer placement needed	shorter placement needed
Year 1			
Year 2			
Year 3			
Year 4			

comments

4. Did you feel well prepared for a 4 week placement in 2nd year following the 12 day serial visit experience ? Y / N

If 'No', in what respect did you feel ill-prepared ?

5. Consider the observation and teaching inputs at the associate primary school.
1st year 4 days
2nd year 4 days

Do you see this as an important and relevant aspect in relation to teaching in a secondary school ? Y / N
Please give reasons.

How many days in total have you spent in primary school ?

Is the length of the primary placement appropriate ?

	about right	longer placement needed	shorter placement needed	should be abandoned
Year 1				
Year 2				

Comments

6. We are interested in your perceptions of the strengths you may have to offer schools whilst you are on placement. Consider the skills, attitudes and knowledge listed below and indicate where you would place yourself at present and when you started on the course. Place the appropriate number in the box.
The scale reads with 4 representing strong or very good, and 1 indicating poor or weak.

• **Strengths of students :** • ***attitudes, skills and knowledge***	when I you started	Now
• understanding of design approaches		
• technological capability : electronics		
• : pneumatics		
• : structures		
• : mechanics		
• : control tech .		
• confidence in communication		
• with *pupils* : one to one		
• : whole class		
• : small group		
• with *staff* : one to one		
• : small group		
• preparing teaching inputs (lesson)		
• willingness to practise		
• willingness to listen		
• teaching strategies		
• manufacturing skills		
• graphical communication skills		
• awareness of media, resources and materials		
• developing and sharing new ideas		
• preparing handouts, worksheets, visual aids, etc .		
• using resources / stimulus materials		
• computing skills CAG include DTP, CAD		
• WP		
• CONTROL		
• integrating design and technology		
• placing of D & T in context of society and work place		
• discussing value issues in design and technology		
• displaying initiative		
• self monitoring		
• self evaluating /appraising		
• independence of thought and action		
• flexibility		
• curiosity		
• willingness to grasp opportunities		
• willingness/ confidence to contribute		
• willingness to co-operate		
• caring attitude towards pupils		
• awareness of educational issues		
• awareness of design and technological issues in education		
• potential to be a competent teacher of d & t		
(aspect(s) of your own devising :)		

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7. Consider the assessment forms / feedback reports you received from school.
Did anybody see you teach?

Y / N

How often were you seen teaching ? a) by a university tutor
b) by internal staff

Did the school provide adequate informal feedback ? Y / N

Did anyone discuss your final school report with you ? Y / N
If 'Yes', who was the main provider of feed back ?

8. How aware are you of the -	**very**	**fairly**	**barely**	**not at all**
• aims / rationale of the B.Ed D & T course at Strathclyde				
• structure of the B.Ed D&T course at Strathclyde				
• components of the B.Ed D&T course at Strathclyde				
• overall assessment criteria of the B.Ed D&T course at Strathclyde				

How aware do you think school technology depts. are of the	**very**	**fairly**	**barely**	**not at all**
• aims / rationale of the B.Ed D & T course at Strathclyde				
• structure of the B.Ed D&T course at Strathclyde				
• components of the B.Ed D&T course at Strathclyde				
• overall assessment criteria of the B.Ed D&T course at Strathclyde				

9. Do you think school departments should have more information on the

course work Y / N
exams Y / N
assignments Y / N

If 'Yes', how do you think this would help students on placements ?

10. Are you satisfied with your own level of knowledge of health and safety issues ? Y / N
If 'No', indicate the aspect (s) of concern.

General
The course is composed of many different aspects, reflecting the nature of Design and Technology itself.
11. Which aspect or component have you felt most comfortable with, to date ? Try to give reasons for this.

12. Which aspect or component have you felt most *un*comfortable with, to date ? Try to give reasons for this.

13. Note the aspect(s) or component(s) of the course that you have enjoyed the most , to date. Try to give reasons for this.

14. Is there any particular aspect(s) of Design and Technology which, in your opinion, the course does not cover sufficiently or omits completely ? Y / N
If 'Yes', indicate which and why you feel inclusion would be beneficial.

15. Is there any aspect of the course which you feel should be altered ? Y / N
If 'Yes', state which aspect and why.

Any other issues and comments which will assist us in our evaluation of the B.Ed (Hons) Design and Technology ?
Please record your thoughts and opinions freely !

Additional Comments

Thank you for your assistance in completing this questionnaire. We do appreciate your time and support .
Would you be willing to discuss these issues further if required ? Y / N
If 'Yes', please add your name: